Accel. Biology
Meiosis Webquest

Name: _____
period_____ date: _____

Meiosis Webquest

Meiosis is a special type of cell division necessary for sexual reproduction. In animals, **meiosis produces gametes** like sperm and egg cells, while in other organisms like fungi it generates spores. Meiosis begins with one diploid cell containing two copies of each chromosome (homologous pairs) —one from the organism's mother and one from its father—and **produces four haploid cells** containing one copy of each chromosome. Each of the resulting chromosomes in the gamete cells is a unique mixture of maternal and paternal DNA, ensuring that offspring are genetically distinct from either parent. This gives rise to genetic diversity in sexually reproducing populations which is important for adapting to changes in their environment.

In this investigation, you will view sites that illustrate the process of meiosis. For each site answer the questions associated. You can either type out the sites listed or go to the THS Library homepage and click on the links.

Site 1 - Lew-Port's Meiosis Page
Go to http://www.lew-port.com/10712041113402793/lib/10712041113402793/animations/meiosis.html -> click on Meiosis

1. How many chromosomes does the cell in this animation start with (its diploid number)? _____
2. The homologous pairs are represented by similar _____
3. Copies of chromosomes are held together by the _____
4. Each chromosome finds its _____
5. Draw "crossing over" - using your pencil to shade in the areas that exchange parts.

6. How many chromosomes are at each pole of the cell? _____
7. During meiosis 2, chromosomes line up again along the cell's _____
8. Only _____ copy of each chromosome moves toward the poles. Which means only _____ chromosomes of the original six.
9. New membranes form around each _____
10. Each cell divides, forming a total of _____ cells.

Site 2 - Sumanas Inc., Animation of Meiosis
http://www.sumanasinc.com/webcontent/animations/biology.html ---> click on Meiosis

11. Read the introduction. Explain the difference between sexual and asexual reproduction (asexual reproduction is when cells divide by mitosis).

(Click to Animate)
12. DNA replication takes place when? _____
13. Meiosis consists of two cell divisions: _____ & _____

14. Centrosomes (aka centrioles) migrate to _____
15. The pairing of homologous chromosomes is called: _____
16. Crossing over points are called _____
17. What happens in metaphase I _____
18. What happens during anaphase I _____
19. What is interkinesis? _____
20. In prophase II, each cells is [diploid / haploid] (circle)
21. In metaphase II, chromosomes line up in [single | double] file.
22. What happens during telophase II? _____
23. (Click to Conclusion). Each of the four daughter cells produced by meiosis is [identical / unique]

(Click to Quiz)

24. With respect to meiosis, when does DNA replication occur? _____
25. When does crossing over occur? _____
26. During which phase do chromosomes line up along the equator? _____
27. During which phase does the nuclear membrane form around the chromosomes? _____

Site 3: PBS: Mitosis vs. Meiosis
http://www.pbs.org/wgbh/nova/baby/ --> Click on "Mitosis vs. Meiosis"

28. View and study the animation, then fill out the chart below, by placing a check in the box or boxes to indicate which the event occurs in (some events might have checks for both mitosis and meiosis).

	Meiosis	**Mitosis**
Two cell divisions		
Centrioles appear		
Spindle fibers form		
homologous chromosomes pair up		
chromosomes line up on equatorial plate		
crossing over occurs between homologous pairs		
Cytokinesis occurs		
Four daughter cells		
produces diploid daughter cells		
produces haploid daughter cells		

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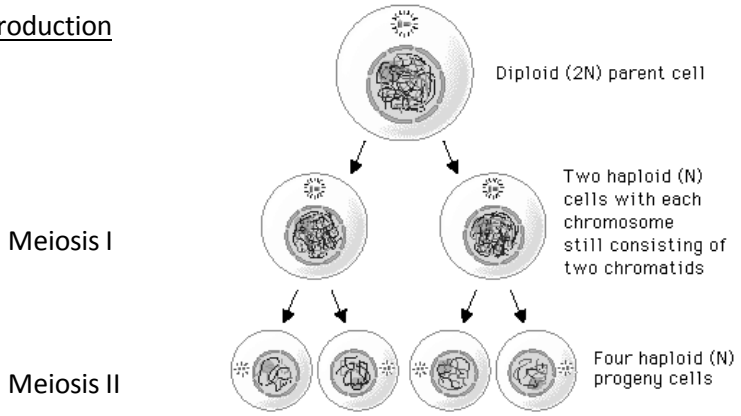
Site 4: Meiosis I and II – step-by-step
Go to: http://www.phschool.com/science/biology_place/biocoach/meiosis/intro.html

Concept 1: Introduction



1. How many divisions of a single cell occurs to produce 4 progeny cells? _____
2. Are the cells at the end of meiosis I diploid or haploid? _____
3. Are the cells at the end of meiosis II diploid or haploid? _____

• Now step through concepts 2-17. As you read and watch the animations, use the attached sheet to draw pictures, label and describe what is happening in the cell during each phase. Pay particular attention to the chromosomes and when they are diploid and haploid numbers in the cells as they divide.

Apply what you have learned:

1. A human cell has 46 total or 23 pairs of chromosomes. Following mitosis, the daughter cells would each have a total of _____ chromosomes. After meiosis I, the two daughter cells would have _____chromosomes, and after meiosis II _____ chromosomes.

2. The process of meiosis produces four cells with nonidentical chromosomes. This diversification occurs during:

3. Put a check mark next to which of the following (may be more than one) are unique to meiosis and not a part of mitosis?
   - Chromosomes line up on the equatorial plate
   - Homologous chromosomes pair up and crossing over occurs.
   - Diploid daughter cells are formed.
   - Haploid gamete cells are formed.
   - Spindle fibers attach to chromosomes.

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4. Some organisms are capable of asexual or sexual reproduction. Under favorable conditions, reproduction proceeds asexually. When conditions become more stressful reproduction switches to a sexual mode. Propose and explanation for <u>why</u> this phenomenon might occur?

5. One of the earliest events that distinguishes meiosis from mitosis occurs in prophase I and involves:

6. Coral in the ocean grows by budding, where the new organism grows out of the old one by mitosis. This form of replication is an example of _____ _____.

7. In Meiosis, _____ most closely resembles events of mitosis except that the cells are _____.

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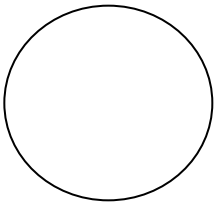
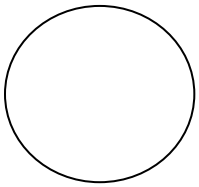
Parent Cell

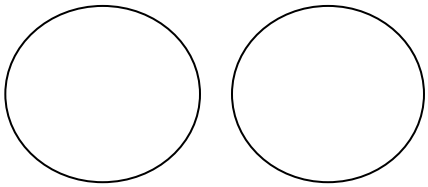


Meiosis I

Meiosis II



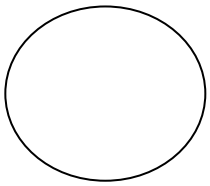
prophase I



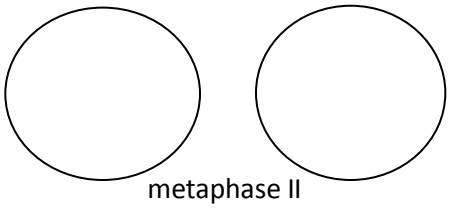
prophase II

_____
_____
_____

_____
_____
_____



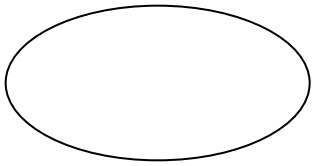
metaphase I



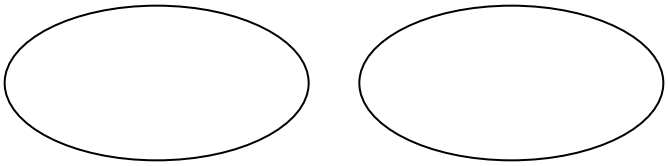
metaphase II

_____
_____
_____

_____
_____
_____



anaaphase I



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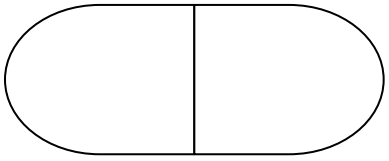
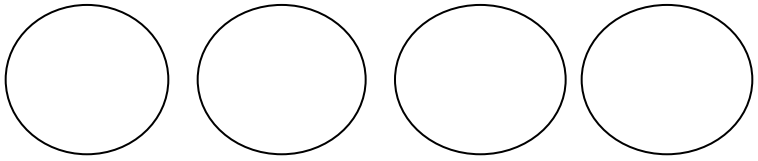


Telophase I and cytokinesis



Telophase II and cytokinesis

_____
_____
_____

_____
_____
_____